

A review on effects of Climate Change on Mental Health

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Abstract: *Global climate change can be defined as multidimensional system of changes in environment which affect the human beings. These changes are dynamic and influence the not only the physical health but also human behaviour It is one of the great challenges of our time. The ongoing movement in climate change strategy of the government of India (GOI) is, along these lines, emphatically grounded in worldwide, national and neighbourhood authenticity. The reliable financial development of India over the most recent couple of years and the possibility to keep up such development in the coming decades has carried India closer to the USA, a position reproduced in China, which additionally now accept worldwide authority in environmental change matters.*

Key Words: *Climate, Global Warming, Climate Changes, Environment, Atmosphere.*

1. INTRODUCTION:

Global climate change can be defined as multidimensional system of changes in environment which affect the human beings. These changes are dynamic and influence the not only the physical health (Watts et al. 2015) but also human behaviour (Clayton et al. 2015). It is one of the great challenges of our time.

There have been lot of studies on the drivers of climate change and most important are “Anthropogenic” means human actions which cause climate change (Rosa and Dietz, 2012). Main cause of climate change is emission of greenhouse gases and their long lived nature lead to increase in atmospheric concentrations. It has been increased due to human activities like fossil fuel use, deforestation etc. The current geological era can be designated as “The Anthropocene” in which human activity is a primary driver (Jorgenson et al. 2019). Climate change can be studied through different perspectives like anthropological, archeological, geographical, and sociological which emphasize on cultural, economic, political, and factors of climate change.

Human activities produce a flux of complex alteration with setbacks related also to mental health (Cianconi et al. 2015). The changes in global climate resulted in rising temperatures, drought, floods, hurricanes, tornadoes, fire, glaciers, disappearance of rivers and desertification. All of these affect human physical as well as mental health. There are studies on how adults (Reser & Swim 2011) and children (Ojala 2012) cope with the risk of climate change.

2. Various factors responsible for climate change:

Impact of economic system

Different economic activities and trends can lead to increased carbon emissions. It includes national economic growth and local-level processes as well as the broader impacts of collective and individual economic practices. Potential changes in national-level carbon emissions due to the effect of economic development can be assessed by sociological research through applying longitudinal modeling techniques and statistical interactions (Longhofer and Jorgenson, 2017; Thombs, 2018).

One example of how economy affects the climate change came from USA. In USA carbon emission from burning fossil fuel decreased in the period of six years (2007 to 2013) i.e. recession period (Feng et al. 2015). The reason behind this decline can be reduction in overall economic activity including changes in the production of industrial goods and adequate enhancement in the use of renewable energy relative to fossil fuel energy (Feng, et al. 2016).

Impact of Consumption

As utilization is often times the biggest segment of yield, social researchers have studied its role in greenhouse gas outflows. Consequently, the ascent of buyer society or consumer culture, in which individuals progressively practice a purchaser situated method of life, can be comprehended as a driver of emissions (Baudrillard, 2017). Pay, infrastructure, social association, and culture all influence expenses and investments and ultimately affect environmental change. Usually higher salary leads to higher vitality utilization and carbon emanations. As per research in geology, the urbanization of populations, especially in low and moderate salary settings, is additionally connected with the advancement of high resource consuming ways of life (Leichenko and Solecki, 2005).

Picking efficient power vitality choices, for example, housetop sunlight based photovoltaic frameworks, has been appeared to have a solid spatial example of appropriation prompting the end that "peer impacts" can be a solid power in consumer decisions. Reception frequently happens among neighbouring homes, regardless of monetary class and ideological group (Graziano and Gillingham, 2015).

Impact of inequality

Studies in geology and human science shows that ongoing decades have seen expanded worldwide re-appropriating, through assembling or extraction, of contamination from wealthier nations to more poor ones (Prell and Feng, 2016) and among districts inside a country (Collins et al. 2016; Feng et al., 2013). Poor districts regularly give inputs and work for worldwide organizations, and are the areas of the phases of vitality escalated creation that contribute vigorously to contamination, including carbon outflows from the consuming of petroleum products (Feng et al., 2013; Prell et al. 2014).

Internationally, families with livelihoods in the top 10% are liable for 36% of carbon outflows, while those in the base half are answerable for just 15% of outflows. The normal yearly carbon impression of worldwide elites is around multiple times that of the most reduced pay gathering. In 2010, these impressions went from 26.3 tons for the most noteworthy worldwide pay classification to 1.9 tons for the least (Hubacek et al., 2017).

Impact of Population

The size and development of the human populace are entrenched as significant drivers of ecological change, including carbon outflows, and much sociology research gives exact proof supporting these cases (Jorgenson and Clark, 2010, 2013). Be that as it may, the complex ecological impacts of populace development, joined with other segment factors, are less regularly recorded. While population development in poor countries, which will in general be higher than in rich countries, adds to rising vitality utilization and discharges, research in geology and human science recommends that such development undermines worldwide atmosphere dependability not exactly well off countries' utilization rehearses do (Jorgenson and Clark, 2013; Hubacek, Baiocchi, Feng, and Patwardhan, 2017a).

Past population size and development, other segment also attributes with significant ramifications for outflows incorporate age circulation, number of families, and normal family size in a given populace (Adua et al. 2016). Vitality use and discharges will in general be higher when a bigger portion of the population is working matured (York, 2007). In certain unique circumstances, the quantity of families is a more significant driver of natural effects than is the quantity of individuals (Liu et al. 2003; York and Rosa, 2012). Family unit size is declining in wealthy countries, which prompts increments in vitality utilization and carbon outflows (Weber and Matthews, 2008).

Impact of land use transformations

Both land-use change and related biomass consuming are significant drivers of environmental change in contemporary settings; specifically, the farming, ranger service, and other land-use part adds to about 25% of net anthropogenic discharges, fundamentally from deforestation, rural soil-and supplement the board practices, and domesticated animals (IPCC, 2014). Social researchers normally study land change in rustic spaces, including the tropics, where they address the social and institutional procedures of deforestation (Rudel, 2005). As significant, their examinations of urban, rural, and exurban land-use and land-spread change are basic for understanding urban inhabitants' asset utilization designs and related ozone depleting substance outflows (Rudel, 2009; Marcotullio et al., 2014; Romero-Lankao et al., 2014).

3. Effect of climate change on mental health:

Environmental change affects a large number of the population, in various land regions and with various kinds of dangers to general wellbeing. Absence of writing is maybe because of the multifaceted nature and curiosity of this issue. The phenomenology of the impacts of environmental change contrasts significantly—some psychological issue are normal and others increasingly explicit according to atypical climatic conditions. Also, environmental change likewise influences distinctive populace bunches who are straightforwardly uncovered and increasingly defenceless in their topographical conditions, just as an absence of access to assets, data, and assurance. Maybe it is likewise worth underlining that in certain papers the association between climatic occasions and mental issue was depicted through the presentation of new terms, instituted as of late: ecoanxiety, ecoguilt, ecopsychology, environmental anguish, solastalgia, biospheric concern, and so on (Cianconi et al. 2020). Following are the effects of different factors of climate change on mental health.

Rising temperature

Investigation on psychological well-being and temperature has concentrated on psychopathology and quality of life. The connection between high temperatures and suicide has for some time been of intrigue, yet given the complex etiology of self-destruction and the troubles in secluding temperature as an indicator, this is a questionable subject (Deisenhammer 2003). An 11-year time arrangement examination of all passing in the United Kingdom found that when temperatures surpassed 18°C, there was a 3.8% expansion in the relative danger of suicide for each 1°C augmentation (Page et al. 2007). Recent studies by Goodman et al. (2018) revealed that raised temperatures brought down PSAT scores among 10 million US secondary school students who stepped through the examination on various occasions. These shortfalls were bigger for low-pay understudies.

Drought and Flood

Both quality of life (Carroll et al. 2009) and mental prosperity (Coehlo et al. 2004) endure with extreme weather conditions like drought and flood. Australian farmer's list capricious monetary conditions furthermore, dry season as the most well-known wellsprings of life stress (Staniford et al. 2009). The differential effects of dry spells on farmers vis-a-vis industrial facility workers proposes a financially interceded sway, given the reliance of farmer's job on precipitation. This control impact likewise decreases the believability of elective clarifications of dry spell impacts on pressure. Drought is related to chronic physiological stress directly as seen in Kenya where reduction in precipitation resulted in increase in cortisol among poor farmers (Haushofer & Fehr 2014). Droughts also linked with dropping employment rates and increased financial pressure among farmers (Edwards et al. 2009).

Promptly earlier and year and a half after flooding in a rustic Korean town, in general personal satisfaction dropped (Heo et al. 2008). People who detailed more prominent flooding sway (e.g., property misfortune, injury) had more prominent reductions in personal satisfaction. Following the flooding, paces of posttraumatic stress issue (PTSD) were a lot higher than Korean standards, as were levels of gentle misery.

Basic mental responses to outrageous climate catastrophes, for example, delayed dry spell, floods, furthermore, tropical storms or hurricanes incorporate wretchedness, PTSD, uneasiness, and increased family strain. PTSD is the most considered emotional wellness outcome of fiascos. For example, 68% of studies following common and human debacles checked on by Norris et al. (2002) recorded raised PTSD side effects, and Galea et al. (2005) audit assessed a 30–40% predominance pace of PTSD for both regular and human debacles.

Ladies will in general be more susceptible to PTSD and depression, though men all the more normally experience the ill effects of substance misuse. Basic matured youngsters are increasingly inclined to experience the ill effects of PTSD and uneasiness, and people with social help admission better following catastrophes. In their rundown of debacle impacts, Norris et al. (2002) found a higher rate of exceptionally serious hindrance for youngsters (29.6%) contrasted with grown-ups (18.3%).

Air pollution

A few specialists have inspected transient vacillations in air contamination after some time corresponding to mental issues, including suicide (Yang et al. 2011), psychiatric 911 calls (Rotton and Frey 1984), and psychiatric ER visits (Szyszkwicz et al. 2009, 2010). These affiliations join measurable alterations for meteorological factors (e.g., temperature), fleeting boundaries, for example, season and day of week, and financial patterns.

Younon et al. (2017) found a positive relationship between constant introduction to particulates and adolescent wrongdoing in a longitudinal examination. Their staggered displaying consolidated broad individual, meteorological, also, other poison controls. Strikingly, research facility concentrates likewise show that contamination introduction hoists bothering and outrage (Jones and Bogat 1978, Rotton et al. 1979) just as untrustworthy conduct (Lu et al. 2018). Welsch (2010) also found that quality of life is deteriorated with increase in air pollution.

Climate change policy in India

For Current situation of climate change most important need is to develop new policies or change the current arrangement set up. India is known for having the individual's agreeable policies from long, going back somewhere down in to the history when even the present created world, especially the west was as it were a food finder network. The Conference of the Parties (COP), a sort of world parliament on environmental change issues containing all States that are Parties to the Convention, is the highest dynamic body of the Convention, meeting consistently in different parts of the world (Rhaman, 2016). The COP gatherings survey usage of the Convention, looking at the responsibility of Parties considering the Convention's objective, new logical discoveries and experience picked up in actualizing atmosphere change arrangements. COP-23 is being held in November 2017 in Bonn.

India is highly vulnerable to effects of climate change because of its southward position in Asia. It is mainly because of its unique geography (Saryal 2018). Problems are further intensified by high population density and continuing acute mass poverty. Moreover, it also face increased flooding, high mortality rates due to heat and shortage

of water and food as a consequence of drought ((Saryal 2018). India is under severe international pressure to take a lead role in global climate negotiations.

Researchers have contended that the post-2007 period saw a move in India's climate change policy (Thaker and Leiserowitz, 2014). The constitution of the powerful Head administrator's Council on Climate Change in 2007 to organize the national activity for evaluation, adjustment and mitigation was seen as a pragmatic step. Following the general elections of 2014, pragmatism has proceeded with energy and, it appears, some new experiences.

The profound enthusiasm for climate change in Prime Minister Narendra Modi became obvious when a couple of months in the wake of assuming responsibility, he reconstituted the Prime Minister's Council on Environmental Change trying to 'resuscitate and smooth out the committee and set the plan to manage environmental change' (Menon, 2014). In the COP-20 in Lima, the Indian minister for Environment, Forests and Climate Change focused on India's dedication furthermore, preparation to have its influence in the worldwide battle against climate change. Correspondingly, before the COP-21 in Paris, the GOI unequivocally expressed that the Intended Nationally Determined Contributions (INDCs), the instruments submitted to the UNFCCC before the Paris Conference, ought to be 'broadly decided'. These INDC reports are set up by each state to manage the national proportions of each separate state to battle environmental change. These reports were submitted to the UNFCCC and talked about in the COP-21 in Paris, which finished in the Paris agreement (Saryal 2018). The Indian Government confirmed the Paris Agreement at the UN central command in New York on 2 October 2016, essentially picking Mahatma Gandhi's introduction to the world commemoration to show to the world that India is following the direction of perhaps the best head, who 'drove an existence of least carbon impressions' (The Guardian, 2016).

Recently, Prime Minister Modi has expanded India's policy on climate change when he asked the ministers to frame India's climate change policy along more practical lines. When He was addressing the United Nations Educational, Scientific and Cultural Organization (UNESCO), he also added a new component to India's policy on climate change by saying 'Too often, our discussion is reduced to an argument about emission cuts. But, we are more likely to succeed if we offer affordable solutions, not simply impose choices' (Saryal.2018). It has begins with the country's desire to follow a low carbon development path. Prime Minister Modi has also started preparation for material based presentation on the Indian cultural ethos for the Paris Conference. The idea was to demonstrate to the world India's contribution in protecting the environment through the ages (Saryal.2018).

In an address to the Heads of the Indian Missions in New Delhi, Prime Minister Modi said that the present worldwide condition speaks to an uncommon chance, when the world is quick to grasp India, and India is pushing ahead with certainty. He encouraged the Heads of the Indian Missions to utilize this novel chance to help India position itself in a main job, as opposed to similarly as an adjusting power, comprehensively (Saryal.2018). What is one of a kind about India playing an influential position in climate change isn't just worry about restricting tops on India's truly developing carbon emanations yet a longing to cause the world to comprehend the estimation of conduct guideline and changes in way of life in the more extensive setting of environmental change moderation activity.

5. Conclusion:

The ongoing movement in climate change strategy of the government of India (GOI) is, along these lines, emphatically grounded in worldwide, national and neighbourhood authenticity. The reliable financial development of India over the most recent couple of years and the possibility to keep up such development in the coming decades has carried India closer to the USA, a position reproduced in China, which additionally now accept worldwide authority in environmental change matters. This changed geopolitical setting of the world, contrasted with the mid 1990s, implies that India is not any more ready to act as a pioneer of the G77 alliance of creating countries in environmental change arrangements, as happened at first. Rather, India has shaped a gathering with other quick rising economies to advance her national advantages in environmental change arrangements. To accomplish the entirety of this, a progressively capable and productive move in India's (and China's) climate change strategy has been a coherent advance.

References:

1. Adua L, York R, Schuelke-Leech B. (2016). The human dimensions of climate change: A micro-level assessment of views from the ecological modernization, political economy and human ecology perspectives. *Social Science Research* 56: 26–43.
2. Baudrillard J. (2017). *The consumer society: Myths and structures*. Los Angeles, CA: Sage.
3. Carroll N, Frijters P, Shields MA. (2009). Quantifying the costs of drought: new evidence from life satisfaction data. *J. Popul. Econ.* 22:445–61.
4. Cianconi P, Betrò S, Janiri L (2020) The Impact of Climate Change on Mental Health: A Systematic Descriptive Review. *Front. Psychiatry* 11:74. doi: 10.3389/fpsy.2020.00074

5. Cianconi P, Tarricone I, Ventriglio A, De Rosa C, Fiorillo A, Saito T, et al. (2015) Psychopathology in postmodern societies. *J Psychopathol* 21: 431–9.
6. Clayton S, Devine-Wright P, Stern PC, Whitmarsh L, Carrico A, et al. (2015). Psychological research and global climate change. *Nat. Clim. Change* 5:640–46
7. Coehlo AEL, Adair JG, Mocellin JSP. (2004). Psychological responses to drought in North East Brazil. *Rev. Int. Psicol.* 38:94–103.
8. Collins MB, Munoz IA, JaJa J. (2016). Linking “toxic outliers” to environmental justice communities across the United States. *Environmental Research Letters* 11: 1–9.
9. Deisenhammer EA. (2003). Weather and suicide: the present state of knowledge on the association of meteorological factors with suicidal behavior. *Acta Psychiatr. Scand.* 108:402–9.
10. Edwards B, Gray M, Hunter B. (2009). A sunburnt country: the economic and financial impact of drought on rural and regional families in Australia in an era of climate change. *Austr. J. Lab. Econ.* 12:109–31.
11. Feng K, Davis S, Li X, Guan D, Sun L, Liu W et al. (2013). Outsourcing CO₂ within China. *Proceedings of the National Academy of Sciences* 110: 11654–11659.
12. Feng K, Davis S, Sun L, Hubacek K. (2015). Drivers of U.S. CO₂ emissions 1997–2013. *Nature Communications* 6: 8714
13. Feng K, Davis S, Sun L, Hubacek K. (2016). Reply to contribution of natural gas to U.S. CO₂ emission reductions since 2007 greater than proposed. *Nature Communications* 7: 10693
14. Galea S, Nandi A, Vlahov D. (2005). The epidemiology of post-traumatic stress disorders after disasters. *Epidemiol. Rev.* 27:78–9.
15. Goodman J, Hurwitz M, Park J, Smith J. (2018). Heat and learning. *NBER Work. Pap.* 24369.
16. Graziano M, Gillingham K. (2015). Spatial patterns of solar photovoltaic system adoption: The influence of neighbors and the built environment. *Journal of Economic Geography* 15: 815–839.
17. Haushofer J, Fehr E. (2014). On the psychology of poverty. *Science* 344:862–67.
18. Heo J, Kim MH, Koh SB, Noh S, Park JH, et al. (2008). A prospective study on changes in health status following flood disaster. *Psychiatry Investig.* 5:186–92.
19. Hubacek K, Baiocchi G, Feng K, Munoz Castillo R, Sun L, Xue J. (2017). Global income inequality and carbon footprints: Can we have the cake and eat it too? In Ó. Dejuán & M. A. Cadarso (Eds.), *Environmental and economic impacts of decarbonization. Input-output studies on the consequences of the 2015 Paris agreements*. Abington, England: Routledge.
20. Hubacek K, Baiocchi G, Feng K, Patwardhan A. (2017a). Poverty eradication in a carbon constrained world. *Nature Communications* 8: 912.
21. IPCC. (2014). *Climate change 2014: Mitigation of climate change*. In O. Edenhofer, R. Pichs-Madruga, Y. Sokona, E. Farahani, S. Kadner, K. Seyboth, & J. C. Minx (Eds.), *Contribution of working group III to the fifth assessment report of the Intergovernmental Panel on Climate Change*. Cambridge, England: Cambridge University Press.
22. Jones J, Bogat G. (1978). Air pollution and human aggression. *Psychol. Rep.* 43:721–22.
23. Jorgenson A, Clark B, Kentor J. (2010). Militarization and the environment: A panel study of carbon dioxide emissions and the ecological footprints of nations, 1970–2000. *Global Environmental Politics* 10: 7–29.
24. Jorgenson A, Clark B. (2013). The relationship between national-level carbon dioxide emissions and population size: An assessment of regional and temporal variation, 1960–2005. *PLoS ONE*, 8: e57107.
25. Jorgenson AK, Fiske S, Hubacek K, Li J, McGovern T, Rick T, Schor JB, Solecki W, York R, Zycherman A. (2019). Social science perspectives on drivers of and responses to global climate change. *WIREs Clim Change* 10:e554.
26. Leichenko RM, Solecki, WD. (2005). Exporting the American dream: Globalization and the creation of consumption landscapes in less developed country cities. *Regional Studies* 39: 241–253.
27. Liu J, Daily GC, Ehrlich PR, Luck GW. (2003). Effects of household dynamics on resource consumption and biodiversity. *Nature* 421: 530–533.
28. Longhofer W, Jorgenson A. (2017). Decoupling reconsidered: Does world society integration influence the relationship between the environment and economic development? *Social Science Research*, 65: 17–29.
29. Lu JG, Lee JJ, Gino F, Galinsky AD. (2018). Polluted morality: Air pollution predicts criminal activity and unethical behavior. *Psychol. Sci.* 29:340–55.
30. Marcotullio PJ, Hughes S, Sarzynski A, Pincetl S, Sanchez Pena L, Romero-Lankao P et al. (2014). Urbanization and the carbon cycle: Contributions from social science. *Earth's Future* 2: 496–514.
31. Menon, M (2014). ‘PM’s Climate Change Council Recast’, *The Hindu*, New Delhi Edition. URL (consulted 16 November 2017), from www.thehindu.com/sci-tec/energy-and-environment/gov-reconstitutes-pms-council-on-climate-change/article6567187.ece

32. Norris F, Friedman M, Watson PC, Diaz E, Kaniasty K. (2002). 60,000 disaster victims speak. Part I: an empirical review of the empirical literature, 1981–2001. *Psychiatry* 65:207–39.
33. Ojala M. (2012). How do children cope with global climate change? Coping strategies, engagement and wellbeing. *J. Environ. Psychol.* 32: 225–33
34. Page LA, Hajat S, Kovats RS. (2007). Relationship between daily suicides counts and temperature in England and Wales. *Br. J. Psychiatry* 191:106–12.
35. Prell C, Feng K, Sun L, Geores M, Hubacek K. (2014). Economic gains and environmental losses of US consumption: A world-systems and input-output approach. *Social Forces* 93: 405–428.
36. Prell C, Feng K. (2016). Unequal carbon exchanges: The environmental and economic impacts of iconic U.S. consumption items. *Journal of Industrial Ecology* 20: 537–546. <https://doi.org/10.1111/jiec.12377>
37. Reser JP, Swim JK. (2011). Adapting and coping with the threat and impacts of climate change. *Am. Psychol.* 66: 277–89
38. Rhaman, Mofizur (2016) ‘Climate Justice Framing in Bangladeshi Newspapers, 2007–2011’, *South Asia Research*, 36: 186–205.
39. Romero-Lankao P, Gurney KR, Seto KC, Chester M, Duren RM, Hughes S et al. (2014). A critical knowledge pathway to low-carbon, sustainable futures: Integrated understanding of urbanization, urban areas, and carbon. *Earth's Future* 2: 515–532.
40. Rosa E, Dietz T. (2012). Human drivers of national greenhouse gas emissions. *Nature Climate Change* 2: 581–586.
41. Rotton J, Frey J, Barry T, Milligan M, Fitzpatrick M. (1979). The air pollution experience and physical aggression. *J. Appl. Soc. Psychol.* 9:347–412.
42. Rotton J, Frey J. (1984). Psychological costs of air pollution: atmospheric conditions, seasonal trends, and psychiatric emergencies. *Popul. Environ.* 7:3–16.
43. Rudel T. (2005). *Tropical forests: Regional paths of destruction and regeneration in the late twentieth century*. New York, NY: Columbia University Press.
44. Rudel T. (2009). How do people transform landscapes? A sociological perspective on suburban sprawl and tropical deforestation. *American Journal of Sociology*, 115, 129–154.
45. Saryal R. (2018). climate change policy of India: modifying the environment. *South Asia Research*. doi: 10.1177/0262728017745385 Vol. 38(1): 1–19
46. Staniford AK, Dollard MF, Guerin B. (2009). Stress and help-seeking among drought-stricken citrus growers in the Riverland of South Australia. *Austr. J. Rural Health* 17:147–54.
47. Szyszkowicz M, Rowe BH, Colman I. (2009). Air pollution and daily emergency department visits for depression. *Int. J. Occup. Med. Environ. Health* 22:355–62.
48. Szyszkowicz M, Willey JB, Grafstein E, Rowe BH, Colman I. (2010). Air pollution and emergency room visits for suicide attempts in Vancouver, Canada. *Environ. Health Insights* 4:79–86.
49. Thaker J, Leiserowitz, A. (2014). ‘Shifting Discourses of Climate Change in India’, *Climate Change*, 123: 107–19.
50. The Guardian (2016) ‘India to Ratify Paris Climate Change Agreement at UN’. URL (consulted 2 October 2016), from <https://www.theguardian.com/environment/2016/oct/02/india/paris-climate-change-agreement-un-narendra-modi>
51. Thombs R. (2018). The transnational tilt of the treadmill and the role of trade openness on carbon emissions: A comparative international study, 1965–2010. *Sociological Forum*, 33: 422–442.
52. Watts N, Adger WN, Agnolucci P, Blackstock J, Byass P, et al. (2015). Health and climate change: policy responses to protect public health. *Lancet* 386:1861–914
53. Weber C, Matthews H. (2008). Quantifying the global and distributional aspects of American household carbon footprint. *Ecological Economics* 66: 379–391.
54. Welsch J. (2010). Environment and happiness: valuation of air pollution using life satisfaction data. *Ecol. Econ.* 58:801–13.
55. Yang AC, Tsai SJ, Huang NE. (2011). Decomposing the association of completed suicide with air pollution, weather, and unemployment at different time scales. *J. Affect. Disord.* 129:275–81.
56. York R, Rosa E. (2012). Choking on modernity: A human ecology of air pollution. *Social Problems* 59: 282–300.
57. York R. (2007). Demographic trends and energy consumption in European Union nations, 1960–2025. *Social Science Research* 36: 855–872.
58. Younon D, Tuvblad C, Franklin M, Lurmann F, Li L, et al. (2017). Longitudinal analysis of particulate air pollutants and adolescent delinquent behavior in Southern California. *J. Abnorm. Child Psychol.* 46:1283–93.